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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/686,310	10/15/2003	De Liufu	24076-2	7249

7590 02/01/2005

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EXAMINER	
KOSLOW, CAROL M	

ART UNIT	PAPER NUMBER
1755	

DATE MAILED: 02/01/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/686,310	LIUFU, DE	
	Examiner	Art Unit	
	C. Melissa Koslow	1755	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 December 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 2, and 4-16, 18 and 19* is/are rejected.

7)☒ Claim(s) *3 and 17* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

This action is in response to the amendment of 21 December 2004. Applicant's cancellation of claims 20-31 is acknowledged.

The drawings are objected to because Figures 1 and 2 are of such a poor quality it cannot be determined what is being shown in the micrographs. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The disclosure is objected to because of the following informalities: The serial number and the filing date for the application discussed in lines 14-15 on page 14 need to be provided. Also the serial number in line 18 on page 14 does not correspond to the given title and docket number. The only application with the given docket number is a provisional application having the serial number 60/475,144. Appropriate correction is required.

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The subject matter of claims 3, 12 and 14-17 are not found in the specification.

Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The z range in this claim 6 is outside the z range of claim 1.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 4, 5, 7-11 and 18 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by DE 1,646,699.

The abstract and the formulas in columns 7 and 9 and 10 teach a piezoelectric ceramic. Formulas 1-4 and 6 in column 7 fall within the formula of claims 1, 4 and 5. Formula 5 in column 7 fall within the formula of claims 1, 4 and 7-11. The reference clearly teaches the claimed composition.

Claims 1, 4, 5, 7-11 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over DE 1,646,699.

The abstract teaches a piezoelectric ceramic having the formula $Pb_{1-q}M_q(Mg_{1/3}Nb_{2/3})_xTi_yZr_zO_3$, where q is 0.01-0.2, M is at least one of Sr, Ba and Ca, x is 0.0625-0.5, y is 0.25-0.5 and z is 0.125-0.625. It is clear from the examples that x+y+z=1. This formula overlaps the claimed formulas. Product claims with numerical ranges which overlap prior art ranges were held to have been obvious under 35 USC 103. *In re Wertheim* 191 USPQ 90 (CCPA 1976); *In re Malagari* 182 USPQ 549 (CCPA 1974); *In re Fields* 134 USPQ 242 (CCPA 1962); *In re Nehrenberg* 126 USPQ 383 (CCPA 1960). The reference teaches the claimed compositions.

Claims 1, 2, 4, 5, 7-11, 14, 18 and 19 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by EP 344,978.

This reference teaches a ferroelectric ceramic having the formula $Pb_{1-a}M_a(Mg_{1/3}Nb_{2/3})_xTi_yZr_zO_3$, where a is 0-0.1, M is Ba or Sr, x+y+z=1, x is 0.05-0.7, y is 0.25-0.5 and z is 0.05-0.7. Examples 1-14, 16, 18-21, 22-28, 30 and 32 and comparative examples 1, 2, 4, 6-8, 10 and 12 all fall within the formulas of claims 1, 4, 5 and 7-11. Examples 7, 8, 11, 14 teach compositions which comprises Ta_2O_5. Examples 19-21, 25, 27, 30 and 32 and comparative examples 7, 8, 10 and 12 teach compositions which comprises MnO_2. Examples 22-24, 26 and 28 teach compositions which comprise MnO_2 and Ta_2O_5. Examples 20, 21, 22-28, 30 and 32 and comparative examples 7, 8, 10 and 12 all have a mechanical quality factor that falls within the claimed range. The examples teach the ceramics are poled, which means the resulting ceramic is piezoelectric. The reference clearly teaches the claimed composition and ceramic.

Claims 1, 2, 4, 5, 7-13, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 344,978.

As discussed above, this reference teaches a ferroelectric ceramic having the formula $Pb_{1-a}M_a(Mg_{1/3}Nb_{2/3})_xTi_yZr_zO_3$, where a is 0-0.1, M is Ba or Sr, x+y+z=1, x is 0.05-0.7, y is 0.25-0.5 and z is 0.05-0.7. This formula overlaps that of claims 1, 4, 5 and 7-11. Product claims with numerical ranges which overlap prior art ranges were held to have been obvious under 35 USC 103. *In re Wertheim* 191 USPQ 90 (CCPA 1976); *In re Malagari* 182 USPQ 549 (CCPA 1974); *In re Fields* 134 USPQ 242 (CCPA 1962); *In re Nehrenberg* 126 USPQ 383 (CCPA 1960). The reference teaches the ceramics are poled, which means the resulting ceramic is piezoelectric. The reference teaches the ceramic can further comprise MnO_2 and/or Ta_2O_5. The taught ceramic is used in piezoelectric devices such as transducers. These devices are known to have the claimed structure. The reference does not teach the density of the taught ceramic. The taught process conditions overlap the process conditions disclosed by this application. Therefore one of ordinary skill in the art would expect the density range resulting form the taught process to overlap the claimed range, absent any showing to the contrary. Similar processes can reasonably be expected to yield products which inherently have the same properties. *In re Spada* 15 USPQ2d 1655 (CAFC 1990); *In re DeBlauwe* 222 USPQ 191; *In re Wiegand* 86 USPQ 155 (CCPA 1950). The reference suggests the claimed ceramic and element.

Claims 1, 2, 4, 5, 7-11, 14, 18 and 19 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. patent 4,948,767.

This reference teaches a ferroelectric ceramic having the formula $Pb_{1-a}M_a(Mg_{1/3}Nb_{2/3})_xTi_yZr_zO_3$, where a is 0-0.1, M is Ba or Sr, x+y+z=1, x is 0.05-0.7, y is 0.25-0.5 and

z is 0.05-0.7. Examples 1-9, 11-17 and 19-21 and comparative examples 1, 3-6, and 8-10 all fall within the formulas of claims 1, 4, 5 and 7-11. Examples 6,7 and 9 teach compositions which comprises Ta_2O_5. Examples 14-16 and 19-21 and comparative examples 6 and 8-10 teach compositions which comprises MnO_2. Examples 15, 16 and 19-21 and comparative examples 6 and 8-10 all have a mechanical quality factor that falls within the claimed range. The examples teach the ceramics are poled, which means the resulting ceramic is piezoelectric. The reference clearly teaches the claimed composition and ceramic.

Claims 1, 2, 4, 5, 7-13, 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent 4,948,767..

As discussed above, this reference teaches a ferroelectric ceramic having the formula $Pb_{1-a}M_a(Mg_{1/3}Nb_{2/3})_xTi_yZr_zO_3$, where a is 0-0.1, M is Ba or Sr, x+y+z=1, x is 0.05-0.7, y is 0.25-0.5 and z is 0.05-0.7. This formula overlaps that of claims 1, 4, 5 and 7-11. Product claims with numerical ranges which overlap prior art ranges were held to have been obvious under 35 USC 103. *In re Wertheim* 191 USPQ 90 (CCPA 1976); *In re Malagari* 182 USPQ 549 (CCPA 1974); *In re Fields* 134 USPQ 242 (CCPA 1962); *In re Nehrenberg* 126 USPQ 383 (CCPA 1960). The reference teaches the ceramics are poled, which means the resulting ceramic is piezoelectric. The reference teaches the ceramic can further comprise MnO_2 or Ta_2O_5. The taught ceramic is used in piezoelectric devices such as transducers. These devices are known to have the claimed structure. The reference does not teach the density of the taught ceramic. The taught process conditions overlap the process conditions disclosed by this application. Therefore one of ordinary skill in the art would expect the density range resulting form the taught process to overlap the claimed range, absent any showing to the contrary. Similar processes can reasonably

be expected to yield products which inherently have the same properties. *In re Spada* 15 USPQ2d 1655 (CAFC 1990); *In re DeBlauwe* 222 USPQ 191; *In re Wiegand* 86 USPQ 155 (CCPA 1950). The reference suggests the claimed ceramic and element.

Claims 1, 5, 7-9, 13 and 18 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. patent 5,849,211.

This reference teaches a piezoelectric ceramic. Example 7 teaches a ceramic disk having silver electrodes on either side of the disk and having the formula $Pb_{0.98}Sr_{0.02}(Mg_{1/3}Nb_{2/3})_{0.4}Zr_{0.2}Ti_{0.4}O_3$. This formula falls within that of claims 1, 5 and 7-9. The reference clearly teaches the claimed composition and ceramic.

Claims 1, 4, 5, 7-13 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent 5,849,211.

This reference teaches a piezoelectric ceramic. The examples teach a ceramic disk having silver electrodes on either side of the disk and having the formula $Pb_{1-x}M_x(Mg_{1/3}Nb_{2/3})_{1-y-z}Zr_yTi_zO_3$, where M is Ca, Ba and/or Sr, x is 0-0.15, y is 0.01-0.65 and z is 0.29-0.55. This formula overlaps that of claimed. Product claims with numerical ranges which overlap prior art ranges were held to have been obvious under 35 USC 103. *In re Wertheim* 191 USPQ 90 (CCPA 1976); *In re Malagari* 182 USPQ 549 (CCPA 1974); *In re Fields* 134 USPQ 242 (CCPA 1962); *In re Nehrenberg* 126 USPQ 383 (CCPA 1960). The reference does not teach the density of the taught ceramic. The taught process conditions overlap the process conditions disclosed by this application. Therefore one of ordinary skill in the art would expect the density range resulting form the taught process to overlap the claimed range, absent any showing to the contrary.

SPADA The reference suggests the claimed ceramic and element.

Claims 1, 4, 5, 7-11, 13-16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. patent 6,140,746.

The reference teaches a piezoelectric ceramic, which is present in an ink jet recording head and has the claimed structure. The taught ceramic has the formula $Pb_{1-x}M_x(Mg_{1/3}Nb_{2/3})_{1-y-z}Zr_yTi_zO_3$, where M is Ca, Ba and/or Sr, x is greater than 0 up to 0.2, y is 0.3-0.6 and z is 0.25-0.55. This formula overlaps that of claimed. Product claims with numerical ranges which overlap prior art ranges were held to have been obvious under 35 USC 103. *In re Wertheim* 191 USPQ 90 (CCPA 1976); *In re Malagari* 182 USPQ 549 (CCPA 1974); *In re Fields* 134 USPQ 242 (CCPA 1962); *In re Nehrenberg* 126 USPQ 383 (CCPA 1960). Table 4 teaches the ceramic has a relative permittivity of at least 2200, at least 2500 and at least 2600. The reference suggests the claimed ceramic and element.

Claims 3 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

There is no teaching or suggestion in the cited art of record of a ceramic having the formula of claim 3 or a ceramic having the formula of claim 1 which exhibits a piezoelectric strain constant (d_{33}) that overlaps the claimed range.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melissa Koslow whose telephone number is (571) 272-1371. The examiner can normally be reached on Monday-Friday from 8:00 AM to 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Bell, can be reached at (571) 272-1362.

The fax number for all official communications is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

cmk
January 28, 2005

C. Melissa Koslow
Primary Examiner
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